NATIONAL DEFENSE UNIVERSITY
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HOW WE PROVIDE FOR THE COMMON DEFENSE: A REVIEW OF THE INTERACTIVE DECISION-MAKING PROCESS OF THE V-22 OSPREY PROGRAM FROM 1981 THROUGH 1992

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THE NATIONAL SECURITY STRATEGY PROCESS

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Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
2003		**00-00-2003 to 00-00-2003**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
How We Provide for the Common Defense: A Review of the Interactive Decision-Making Process of the V-22 Osprey Program from 1981 Through 1992	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **National War College,300 5th Avenue,Fort Lesley J. McNair,Washington,DC,20319-6000**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
see report

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**		**14**	

INTERACTIVE DECISION-MAKING PROCESS OF THE V-22 OSPREY PROGRAM FROM 1981 THROUGH 1992

> We the people of the United States, in order to form a more perfect Union, establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.[1]

The Constitution of the United States was designed to serve the interests of all people – the rich and poor, people who are Northerners and Southerners, farmers, factory workers, people in the business world. The Constitutional Convention believed strongly in the rule of the majority, but they wanted to protect minorities against any unjustness by the majority. The framers achieved this goal by separating and balancing the powers of government while including other basic constitutional aims of respect for the rights of individuals and states, rule of the government by the people, the separation of church and state, and supremacy of the national government. By separating and balancing the powers of the leadership of the United States, a system of governance has evolved that allows the inputs, opinions, voices and influence of "interest groups" that combine to form external influences which exert pressure on the decision-making processes and people of the government.

The V-22 "Osprey" tilt-rotor assault troop transport aircraft is an example of how the widespread influences of a multi-faceted bureaucracy interact in the Department of Defense (DoD) procurement process. The V-22 program is an illustration of the inter and intra-governmental practices that involved organizations, cultures, individuals and personalities. The decision-making process on whether or not to procure the V-22 involved a dedicated and passionate Military service, the Marine Corps, coupled with the Congress and influential, lobbying savvy, Defense Contractors, all pitted against a Secretary of Defense who was faced with tightening Defense budgets in the late 1980's. This essay will dissect the development and procurement processes surrounding the V-22, with a focus on the agencies, organizations, individuals, and personalities involved in the process.

THE V-22 OSPREY – OFFICIAL POSITION, CAPABILITIES AND CONTRACTORS

Publicly, the Office of the Chief of Naval Operations' Expeditionary Warfare Director, N75, describe the V-22 as the Marine Corps' expression of Joint Vision 2020, in that it upholds the

key concepts of precision engagement and dominate maneuver. Its greatest asset is its ability to quickly self-deploy combat ready forces, worldwide, allowing the Marines to rapidly respond to crisis situations. With its tilt-rotor design, the Osprey can convert from its helicopter hovering mode, to a forward airplane mode in twelve seconds. The wings and engines allow the aircraft to fly at speeds up to 340 knots, with a range of 1200 nautical miles at 275 knots, while carrying 1,814 kilograms of cargo or up to thirty passengers. The Osprey reached these current program numbers and operational capabilities after an often confrontational and highly controversial beginning.[2] Asking, "Why is the Marine Corps, as well as the Navy, procuring the V-22?" to any action officer in N75, you'll obtain the equivalent response detailed above, because the office's responsibility is to promote the operational expeditionary warfare concepts of the Department of the Navy. Inside Marine Aviation of Headquarters Marine Corps, the response to the question of "Why is the Marine Corps procuring the V-22?" will flow similar to the following:

> "The Osprey will provide our Marines with a needed edge in the complex operations they will face while defending America and American interests in the 21st Century." Additionally, they will add: "Marines pioneered the military use of helicopters [*during the Korean War*], creating conditions for a new form of maneuver that radically altered the nature of tactics, with global military implications. The MV-22 [*Osprey*] is another such innovation. It represents a major step in a new direction, and it is the best aircraft available today for the missions of tomorrow."[3]

From a defense industry prospective, the Osprey is a combat assault aircraft manufactured by a "joint tilt rotor technology team" of the Boeing Company, Vertol Division, in Morton, Pennsylvania, and the Bell Helicopter Textron Corporation in Amarillo, Texas. The Allison Engine Corporation of Indianapolis, Indiana, builds the V-22's engines and is a wholly owned subsidiary of the Rolls-Royce Corporation. Current plans now call for the acquisition of 360 V-22's for the Marine Corps, forty-eight for the United States Navy in combat rescue variants, and the United States Special Operations Command wants fifty V-22's for the Air Force. The United States Army is no longer pursuing procurement of the V-22.[4]

THE V-22 PROGRAM PEOPLE, ORGANIZATIONS AND PROCESS

The V-22 program has been a labyrinth of a bureaucratic struggle, caught up in both formal and informal struggles. Advocates and opponents lined up on loosely defined and shifting "sides." Principle advocates have been the Marine Corps, Congress, and the defense industry network. The DoD, primarily the Secretary of Defense (SECDEF), and components thereof, have shifted sides between 1981 and 1994. The primary "opposition" came in the form of the Bush Administration of 1988-1992, the SECDEF, as well as a few members of Congress, and others in the defense industry and individual Military services.

THE BEGINNING

Within the DoD, the Secretary of the Navy (SECNAV) John Lehman, observed the XV-15, a NASA tilt rotor concept development aircraft, while at the Paris Air Show in June of 1981. As part of the Regan Administration's military modernization and build-up, the SECNAV saw the aircraft as a future replacement for his services' aging fleet of transport helicopters. As an untapped and undeveloped technology, projected development expenses were very costly, estimated in the $1.8B to $2.4B range. Similarly, in December of 1981, the SECDEF, Frank Carlucci, established a Joint Service Advance Rotor Wing Development (JVX) Program to develop a multi-mission aircraft for all of the Military Services. The SECDEF designated the Army as the lead, or executive service, for the program.[5] Carlucci's decision was consistent with the bureaucratic procurement process inside the Pentagon based on the Army's operation of the vast preponderance of the DoD's rotary wing aircraft.

Initial movements and actions were in place: The Services needed a modernized rotary wing aircraft, the Reagan Administration was leveraging the industrial and economic might of the United States as a new strategic revolution in the Cold War against the Soviet Union. With a DoD requirement in place, the industrial capacity and influence of the Defense contractors soon became involved. Bell Helicopter and Boeing-Vertol announced a teaming agreement, the "joint tilt rotor technology team," to develop the tilt rotor know-how. One brought advanced technology in composites to the table, the other had been in the tilt rotor technology business since the 1950's. After design and engineering development and reviews, Allison Engine Corporation of Indianapolis was chosen to provide the power plants for the concept aircraft. A team of technically competent expertise was formed. However, more importantly, the

groundwork was laid for a diverse influence power-base to be developed and exploited. Jerel Rosaiti explained in *The Politics of United States Foreign Policy*:

> "the military-industrial complex works in the professional and personal interests of thousands of individuals in government and defense industries, and has an intertwining effect on what America does in the name of National Security." [6]

In remarkable comparison to the B-1 program of the early 1980's in Rosaiti's example, the Bell-Boeing-Allison team and the V-22 were to grow to have parts and subcomponents developed and manufactured in just over forty states.

INITIAL DEFECTIONS AND CHALLENGES – THE SEEDBED OF CONFRONTATION

During late 1981 throughout much of 1982, the V-22, still in the form of a JVX program surrounding the XV-15 NASA aircraft, was continuing through routine development actions. However, in the fall of 1982, the Army was fighting with internally competing programs, and under the auspices of "other priorities" pushed for delaying the JVX for a couple of years. In a move of unity on the parts of the other Services, the Army relinquished the executive service status to the Navy, but still verbalized support for the program. The Navy assumed the service lead and the tilt rotor concept aircraft began gaining the upper hand in meeting the JVX published operational requirements. By May 1983, the Army withdrew from the JVX program's development phase entirely, still planning to fund production and procurement.[7]

Inside the Office of the Secretary of Defense (OSD), additional defections were mounting. Dr. David Chu, the influential Director for Programs Analysis and Evaluation (PA&E) began to question the tilt rotor program as a worthwhile investment. In direct conflict with the SECNAV, Dr. Chu pushed for a less expensive fleet of conventional helicopters that could match the tilt rotor capabilities at a much lower cost, particularly in the ship to shore mission of the Marine Corps. Dr. Chu's actions are understandable in the context of a bureaucratic politics paradigm. He was charged with analyzing and evaluating DoD procurement programs, balancing cost and benefits of a given program against an entire Department's requirements. His policy position is largely a result of his organizational role within the OSD.[8] However, his arguments were initially marginalized when his office was pressured to publish a January 1984 document noting potential future missions for a JVX aircraft.

With the mounting of influential dissentions, both in the Services and the OSD, the defense industry began to escalate offensive posturing against the dissenters. Still operating the XV-15 concept aircraft, Bell-Boeing began its "Guest Pilot" program. Not a program per se, it was more of a marketing methodology with the aircraft selling itself. Believing in the "gee wiz" and "wow" factor that capture the hearts and minds of little boys at Christmas and young men with their first cars, Bell-Boeing, using an informal yet direct approach, moved to shore up program support on the most influential and accessible portion of the formal bureaucratic procurement process – the Congress. Through the mid 1980's, the XV-15 completed a series of "guest" flights with Senator Berry Goldwater, (R-Az) and Senator John Glenn, (D-Oh), former Marine Aviator, member of the Senate Armed Services Committee. Senator John Tower, (R-Tx), arranged for the SECNAV to fly as a guest, as well as pushed for operational displays into and out of the Pentagon and Capitol Hill helicopter pads. Not focusing purely on elected officials, Bell-Boeing expanded the "guest" list to Director T. Allen McArtor as he flew the XV-15 in order to court the Federal Aviation Administration. The FAA responded with a special project office to coordinate and speed the commercial aviation certification process. Big Defense business, as we have come to know now, is truly global. Bell-Boeing marketed the concept aircraft successfully to industries and governments of the United Kingdom, Japan and Germany.[9] On 15 January 1985 Secretary Lehman announced that the JVX tilt rotor would be the V-22 Osprey. Bell-Boeing would build it, many in Congress would grow to support it, and soon, in defense program lifetimes, a new Administration and Secretary of Defense would try to kill it.

From 1985 to 1988 the V-22 pressed through the bureaucratic processes inside the Pentagon as to the size and scope of the program, development costs, per-unit bottom-line costs, production numbers, and procurement schedules. In order to deliver the aircraft at a fixed bottom-line price that the SECNAV required, Bell-Boeing was forced to invest $125M in private capital to keep the V-22 program on schedule. In the process, major subcontractors were required to spread load the up front costs. Grumman Aerospace, Lockheed and General Electric were added to the V-22 consortium.[10] Initially arranged to share the cost burden of the Osprey, the diversification of contactors served to spread influence throughout the geographic regions of the country. On 18 November 1987, the Army abandoned the program entirely while opting for an expanded enhancement program for their CH-47 fleet. The loss of Army support was a blow within the support network inside the DoD. However, it resulted in a boon for Boeing as they

would collect the CH-47 program monies, whereby easing the up front investment pressures, for their portion of funding the development of the V-22.

By the beginning of 1988, the Osprey hadn't reached its impact on all forty of its constituent states, but the seeds were sown and physical plant expansions and expanded employment in Texas and Pennsylvania had begun. On 23 May 1988 the first V-22 rolled out of Bell's Research Center in Arlington Texas. With a tinge of irony that will continue to manifest itself in the future decision-makers surrounding the V-22, later that same day Dr. Chu's PA&E circulated an OSD memorandum identifying the program's costs to $23.7B. By November, the Nation had a newly elected Republican President, with ties to Texas, and no great change in Administration position was expected with respect to the V-22. Within sixty days of the inauguration, the first Osprey was scheduled to take flight.[11]

NEW ADMINISTRATION – THE ATTACK, MOBILIZATION – DEFENSE AND SURVIVAL

Fiscal challenges and budget pressure forced President Bush to propose a defense spending freeze in February of 1989. He expected an April announcement from the DoD on the range and scope of the cuts. Soon to follow, on 9 March 1989, Congressional partisan politics subverted the nomination of John Tower as the elder Bush's SECDEF. A strong advocate of the V-22 was lost. The DoD, having been without a Secretary for more than a month, experienced the vacating of many long-standing, experienced, top officials from the Department. One remaining official was Dr. Chu, now more than ever, an influential voice in the Pentagon from PA&E. On 10 March, President Bush nominated Dick Cheney (R-Wy), as SECDEF, whose subsequent confirmation by a 92-0 vote on the Senate floor a week later, signaled a relative concurrence between the Legislature and the Executive branch on a Departmental Secretary who would have unencumbered execution of his duties.[12]

THE BUDGET AX – AND THE LUMBERJACK

On 19 April 1989, soon after the first flight of the Osprey prototype, the new SECDEF announced the cancellation of the V-22 program. With Dr. Chu, a goal-oriented, utility-maximizer now as a key advisor, Secretary Cheney, a relative new comer to the Defense procurement process, was faced with the President's April deadline for implementing a DoD spending freeze. Dr. Chu had opposed the V-22 since 1983 when the aircraft was awarded a preliminary design contract. Based on the PA&E role in the DoD, it made for a natural enemy

for the individual services, as the office served as the OSD watchdog for expensive major weapon systems procurement programs. Dr. Chu had worked with Representative Cheney when he was in the Congressional Budget Office. That relationship made Dr. Chu and PA&E the likely choice for formulating the Pentagon's budget cutting proposals. In the lean spending years of the Carter Administration, PA&E had elevated in status and position to that of an Assistant Secretary with successive SECDEFs. When the Reagan Administration took control of the Pentagon in 1981, then SECDEF Caspar Weinberger, in pursuit of a defense build-up including a 600 ship Navy, "muted PA&E's role and down-graded the office head's title from Assistant Secretary to Office Director."[13] PA&E, Dr. Chu specifically, was now in a position to exert positional influences on the new SECDEF, answer the tasking from the White House on budget cutting measures, and personally bolster his position in the Department while enhancing his power over the Service's programmatic procurement process. Dr. Chu didn't hold the Pentagon's procurement monies, but he now had exacting influence on how or if those monies were spent.

The SECDEF's decision was not totally surprising. The Soviet threat was waning, the Regan build up in defense had contributed to the soaring Federal budget deficit, the Bush platform had pledged "no new taxes," and many in Congress were more than ready to reduce overall defense spending.[14] OSD's announcement was linked to the Department's plan to continue the pursuit of strategic modernizations in the form of the B-2 and the Strategic Defense Initiative. Trimming of DoD fat would come from several conventional programs, including the V-22. The Commandant of the Marine Corps, General Al Grey, had exchanged heated arguments with Dr. Chu in the past with regard to the V-22. Now, with the SECDEF's announcement, the Service Chief was a proponent of a program that his "boss" was clearly aligned against. Putting the soon to rage battle over the V-22 in pilot language: "Fight's On."

THE INTERVENTION, ACTIONS AND MOTIVATION OF CONGRESS

Congressional response to Secretary Cheney's action was swift. Resolutions were passed through both Houses, asking the SECDEF to reconsider his decision. Senators Glenn and Stevens (D-Ak) were producers of initial statements. During the remainder of 1989 and into early 1992, testimony solicited by various Senate and House committees involved in the defense and appropriations process, focused on V-22 questions and issues. The SECDEF and then Chairman of the Joint Chiefs of Staff, Admiral Crowe, testified before the House Armed

Services Committee and acknowledge that the V-22 was a very useful aircraft, but far too costly for the specialized Marine Corps mission, [by then Army support was gone and the total Navy and Air Force numbers were well below 100 units]. "Only once in the last forty-five years would the Osprey have been warranted – and that was during the amphibious landing at Inchon." Cheney offered as an alternative, the proposal long percolated by Dr. Chu, to buy twenty-three additional CH-53E helicopters for the Marine Corps at a cost of $349M. The Navy and Air Force variants were not addressed.[15] In the ongoing bureaucratic political battles over the V-22, the SECDEF's attack on the single largest Marine Corps program was a significant tactical mistake.

In the early 1990's there were thirty-five former Marines and active reservists in Congress. They crossed political party affiliations and were geographically spread throughout Nation. Representative Curt Weldon (R-Pa) from the Philadelphia suburbs was on the House Armed Services Committee, and he formed a coalition that attracted one hundred and ten house members and fifteen Senators. Representative Pete Geren (D-Tx) was a vocal and ardent supporter. John Glenn, still a member of the Senate Armed Services Committee, rallied with Senator Arlen Specter (R-Pa), to produce a letter to President Bush, carrying the signatures of forty senators.[16] Coupling that event, with a corresponding letter from the House carrying the signatures from 218 Representatives, they sent a signal to the Bush Administration that there was significant bipartisan support for the V-22. Conservative Republicans and Liberal Democrats were forming a procession, broadly supporting a program of immense Defense dollar costs, seemingly inconsistent with the Administration's direction, given the backdrop of high Federal deficits and expanding budget pressures. Not all in Congress were on the bandwagon. Major congressional challenges to the V-22 program came from the chairmanships of both Houses of Congress' Armed Services Committees, Senator Sam Nunn (D-Ga) and Representative Les Aspin (D-Wi). In a prominent position of leadership and influence, why were these well-known legislators having their influence marginalized?

The number forty reappears in the chronology of the V-22. Forty Senators sign the Specter letter – forty states have an economic incentive to produce the V-22. The representative leadership from those forty states seek job security – re-election. The consortium moves of Bell-Boeing in the late 80's, while initially designed as a cost-sharing measure for the program's survival, had now morphed into a support constituency of national proportion. Two massive V-

22 production facilities were located in Texas and Pennsylvania. Employment estimates in those two congressional representative laden states were for between 2,000 and 3,000 jobs each. An interview with tilt rotor communications director T. Arnold of Bell Helicopter Textron stated that there was good reason to believe that members of Congress from other voter bases also expected expansion of local employment to their states. An interview with a current Marine Corps V-22 program official that was involved in the legislative process in the 1990-1992 timeframe confirmed those comments. A Boeing Space Corporation, Helicopter Division, Internal Memorandum, which described the $353M that was being distributed to subcontractors and businesses in forty-two states covering 258 congressional districts, essentially reconfirmed both of those statements. By the end of the Legislative and Executive battles, twenty-five states had purchase orders or letter contracts each in excess of $500K per state. It was anticipated that the Engineering and Manufacture Development phase of the program would involve between 1,800 to 2,000 subcontractors. Conservative estimates from Bell showed ten thousand jobs linked to the V-22, other estimates were as high as 15,000 - - Fuel tanks in Georgia, (the presumption is that Senator Nunn became happier and more accommodating toward the program), engine casings from Missouri, engines from Indiana, engine starters from North Carolina, production facilities in Pennsylvania, and Texas, flight testing in Maryland, operational evaluation in Virginia, operational employment in North Carolina, California and Hawaii.[17]

The Congressional support for the V-22 cannot be categorized as purely re-election related in the form of bringing dollars and jobs to their respective districts. Congress, in their role as policy makers and program appropriators, must defend their positions on a seemingly daily basis. Their experience in the legislature, staff support, and constituency contact, allows them to develop an effective capacity to evaluate and promote specific programs. The V-22 carried with it a panacea of valid and compelling reasons to justify Congressional prolonging. Routinely, Congressional legislator's districts were not major beneficiaries of contracts pertaining to the V-22, but they continued to support the program. In many cases, the legislators stated that the Osprey's cutting edge technology was capable of modernizing and enhancing Military performance, potentially revolutionizing civilian aviation, and improving the Nation's trade balance. Taken individually, each of the above could be discounted by suitable alternatives. Collectively, they formed a cohesive union that established, garnered support, and sustained the V-22 through the routine skirmishes that existed between the Congress and the DoD from 1989 through 1994.

The military modernization and enhancements were promoted and put forth by the Congress: Operational range, speed, flexibility, the ability to project forces into the littoral regions of the world, without the need for fixed forward bases that were rapidly shrinking in the face of the base realignments and closures in the Post Cold War world. Better equipment, operating more efficiently, equates to reduced operating costs and lowers the costs of manpower. The ability to revolutionize civil aviation often took the form of arguments that civilian variants of the V-22 could reduce growing traffic both in the air and on the ground surrounding the Nation's major municipal airports. The V-22's range, speed and dual-mode helicopter/fixed-wing operation would open the nation's more remote areas to access and development. In terms of competitive advantage for the Nation's trade position, the Osprey would enhance the industrial base of the country against the competition of unified European aircraft manufacturers. And, even more importantly, prevent the development of tilt-rotor technology from escaping to foreign shores. Essentially, the Congress developed a multi-faceted approach to the Osprey's promotion and drives to reach production status.[18] Conversely, the SECDEF, with Dr. Chu's inputs, focused purely on the budget bottom line and a policy of being a proponent of less costly alternatives. After a series of budget measures being enacted by Congress providing support and funding for development of the V-22, being either subverted or ignored by the DoD, the United States Comptroller General ruled that the Secretary had violated U.S. law by impounding Osprey funding.[19] On 2 July 1992, Secretary Cheney told Congress that he would release $1.5B to build six production representative aircraft. After additional posturing moves inside the Pentagon through August 1992, the Bush administration finally dropped its opposition to the V-22.[20]

THE EFFECTS OF AN ORGANIZATION OF UNITY

The Marine Corps' influence in the V-22 program development and interagency process cannot be overstated, both in terms of active Congressional representation as well as the effects of the Corps itself. The Corps' strategy came straight from the Pentagon's procurement playbook: Sell a weapon as a lifesaving necessity, build broad coalitions across public and private self-interested constituencies, and then, once victorious, remain focused and committed. Speak with one voice, unity in action and unity of purpose. On a macro scale, the Corps builds alliances with defense contractors, who make substantial campaign contributions to influential lawmakers and routinely retain retired Marine Generals for their access and expertise. The Corps promotes its spit and polish image on Capital Hill and embodies the "Once A Marine,

Always A Marine" ethos. The Congress responds. Even the Pentagon's decentralization of Defense programs' procurement design and production around the country plays into the Marine Corps' hand. It allows the influence of smaller representative districts to be pooled together to form support organizations.[21] There is even grass roots internal consortium building. A simple example involves a potential "rival" defense contractor in a small instance of influence pedaling: Part of Dr. Chu's counter V-22 proposal from DoD was to purchase additional CH-53E's. Aligned with the DoD official position were United Technologies, the parent company of Sikorski Aircraft, and the manufacturer of the CH-53E helicopter. In addition to gaining a potential contract for building additional CH-53E's, Sikorski was promoting a solely developed alternative to the Osprey, the H-92, and had been successful at pitching the program inside the OSD inner circle. Ironically, the Marine Corps is the largest operator of Sikorski's CH-53's and their corporate representatives would routinely visit various offices inside Marine Corps Headquarters in the Navy Annex. Prominently displayed pictures or calendars containing a full-scale mock-up of the H-92 could be seen in many office spaces. More often than not, during the period leading up to August of 1992, those marketing items somehow found their way from Navy Annex walls and into desk drawers. August of 1992 was the same month that President Bush dropped his opposition to the V-22.

Through the prolonged concept, requirements, contracting, design and development phases, the V-22 faced seeming insurmountable opposition and obstacles. The program's various showdowns from 1981 through 1992 illustrate the dealings of inter and intra-governmental practitioners that are involved in the organizations that form our bureaucratic government machine. Each organization brings specific cultures, key individuals and distinctive personalities to the process. By separating and balancing the powers of the leadership of the United States, our Constitutional system of governance opens itself to the inputs, opinions, and voices that influence and exert pressure on the decision-making processes and people of our government. It's now 2003; Bell-Boeing is still a tilt rotor team, headquartered in Texas. We still have a President Bush. The Secretary of Defense of 1989 to 1992 now presides over the Senate that he once battled, currently serving from the position of the Vice President. The DoD still has a V-22 program - - Together, all "Providing for the Common Defense."

End Notes

[1] "The Constitution of the United States of America," Preamble, Constitutional Convention, 17 September 1787, Philadelphia, Pa.

[2] "MV-22 Osprey." Office of the Chief of Naval Operations, N-75, Expeditionary Warfare. <http://www.exwar.org/1200_current/n753branch/mv_22.htm> (10 December 2002).

[3] Statement by current Marine Corps Commandant, General James L. Jones. His words are posted on the N-75 web page. He again echoed the same in a speech to the Marine Aviation Association at the Capital Squadron Dinner on 4 December 2002., The officials questioned who are associated with Marine Aviation and the U.S. Navy's N-75, had little variance during interviews conducted in December 2002. A review of the official position statements of both Departments portrayed only minor deviation since the advent of the V-22 program.

[4] "MV-22B Osprey Tilt-Rotor Assault Troop Carrier." U.S. Naval Institute Press, <http://www.usni.org/resources/mv22osprey/mv.22osprey.htm> (10 December 2002).

[5] Excerpts from an interview with Dar Lundberg, Bell-Boeing V-22 Program Office, Washington, D.C. Conducted 16 January 1992.

[6] Jerel A. Rosati, "Group Politics," The Politics of United States Foreign Policy, Second Edition, Chapter 16, 475-478.

[7] Robert D. Flanagan, LtCol, USMC, "The V-22 is Slipping Away," Proceedings, U.S. Naval Institute Press, August 1990, 42.

[8] Graham T. Allison and Morton H. Halperin, "Bureaucratic Politics: A Paradigm and Some Policy Implications," World Politics, Spring 1978, 8-9.

[9] "Tiltrotor – A Brief History, Bell Helicopter Major Events," Aeronautical Awards for Tiltrotor Development, Bell Helicopter Textron Interoffice Memo. Ft Worth TX, 11 September 1991.

[10] "Tiltrotor – A Brief History, Bell Helicopter Major Events," Aeronautical Awards for Tiltrotor Development, Bell Helicopter Textron Interoffice Memo. Ft Worth TX, 11 September 1991.

[11] Scott D. Dean and Benjamin F. Schemmer, "Industry Risks Billions on LHX, New Fighters and Aerospace Plane," Armed Forces Journal International, June 1988, 50.

[12] Pat Towell, "Senate Spurns Bush's Choice in a Partisan Tug of War," Congressional Quarterly Weekly Report, 11 March 1989, 530. "Senate Speeds Confirmation of New Pentagon Chief," Congressional Quarterly Weekly Report, 18 March 1989, 592.

[13] D. Griffiths, "Weinberger Puts Muzzle on a Pentagon Watchdog," Business Week, 8 September 1986.

[14] Christopher B. Stoops, LtCol, USMC, "To Kill and Osprey," U.S. National War College, 10 December 1990.

[15] Pat Towell, "Defense Spending Decision Serve to Stir Controversy," Congressional Quarterly Weekly Report, 22 Apr 1989, 916. "Bush's Revisions May Augur Policy Shifts in Future," Congressional Quarterly Weekly Report, 29 April 1989, 976, 979. "Bush's Cuts Would Take Away Some Hometown Bacon," Congressional Quarterly Weekly Report, 13 May 1989, 1141.

[16] Arlen Specter, United States Senate, Letter sent to President George Bush regarding the "Continuation of the Department of Defense V-22 Program," Congressional Record, 138 S7576-7, 4 June 1992.

[17] David Wood, "Storming Capitol Hill: The Few, The Proud, The Politically Wired," The Los Angeles Times, Associated Press, 18 December 2002, 1.

[18] U.S. Congress, House Armed Services Committee, "1991 V-22 Osprey Program Review. Hearings on National Defense Authorization Act for Fiscal Years 1992 and 1993 – H.R. 2100 and Oversight of Previously Authorized Programs." 102d Congress, 1st Session, Washington, D.C., 11 April 1991.

[19] In Lee G. Bolman's and Terrence E. Deal's work titled "Reframing Organizations – Artistry, Choice and Leadership," the authors pointed to frames that shape individual and group power and interest. Of the five Political Frame views presented, Dr. Chu clearly focused his views toward the allocation of scarce DoD resources. Those scarce resources, and his position in PA&E were central to the conflict between the legislature and the SECDEF. See Ch. 9, Power, Conflict and Coalitions, 163.

[20] U.S. Congress, House Armed Services Committee, "1992 The Status of the V-22 Tiltrotor Aircraft Program. 102d Congress, 2nd Session, Washington, D.C., 5 August 1992.

[21] David Wood, "Storming Capitol Hill: The Few, The Proud, The Politically Wired," The Los Angeles Times, Associated Press, 18 December 2002, 1.